DMSO

Common Semantics & Syntax Project

Supporting CMMS

CMMS Technical Working Group (TWG) Meeting
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OUTLINE

- Common Syntax and Semantics Overview
- CSS Project Tasks and Charter
- Syntactical Structure: Command And Control
- Syntactical Structure: Conduct Operations
- To Date Progress
- Tasks To Be Completed
- Project Payoffs
- Next Steps
- Ontological Filter
- CSS Ontological Tool Demonstration
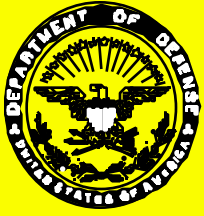
COMMON SYNTAX AND SEMANTICS OVERVIEW

- *Project Is In Progress*
- *Project Output Can Be A Key Foundation Of CMMS*
- *Tool/Heuristic For Domain Modelers/Simulators*

GUIDING PRINCIPALS OF PROJECT:

⇒ SYNTAX Is As An Organizing Principal of Language

⇒ SYNTAX Suggests Structural Relationships Between Processes (Both Cognitive and Physical) And Entities

⇒ SEMANTICS Define The Meaning Of A Verb/Process

⇒ SEMANTIC Features Differentiate One Domain From Another
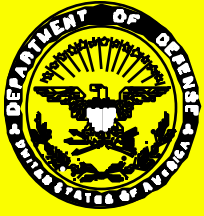
COMMON SYNTAX AND SEMANTICS
PROJECT GOALS

- Help Develop And Institutionalize A Common Language (Semantics and Syntax) For Simulation Developers And Domain Modelers

- Develop Tools That Enhance The Use Of The Common Language (Dictionary, Thesaurus)

- Develop Ontological* Tools And Filters That Can Be Used For Model, Simulation, And (possibly) Doctrine Development

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* Ontology is the branch of metaphysics that is concerned with categories of existence -- that is, the elementary substances or structures out of which the world is made. Ontology analyzes concepts that underlie any phenomenon in a system, e.g. time, space, matter, process, cause and effect.
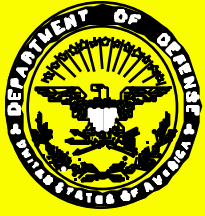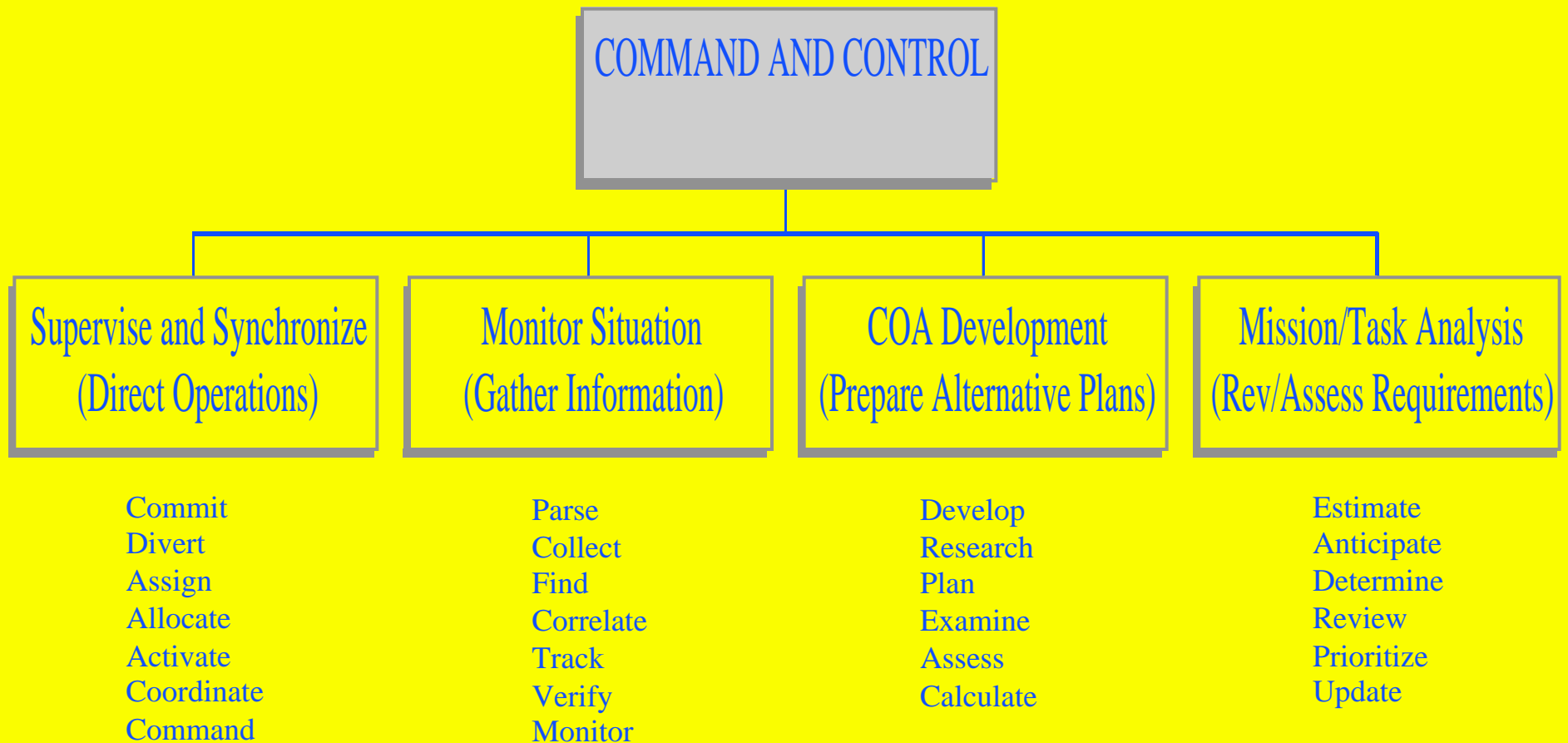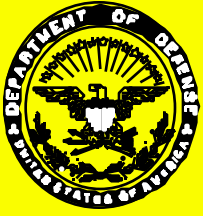
CS&S PROJECT TASKS AND CHARTER

1. Develop Verb Capture Plan

2. Develop Data Structures For Verb Syntax And Semantics
    - Names, Definitions, Attributes

3. Collect Verbs/Process Data

4. Develop Verb Definitions

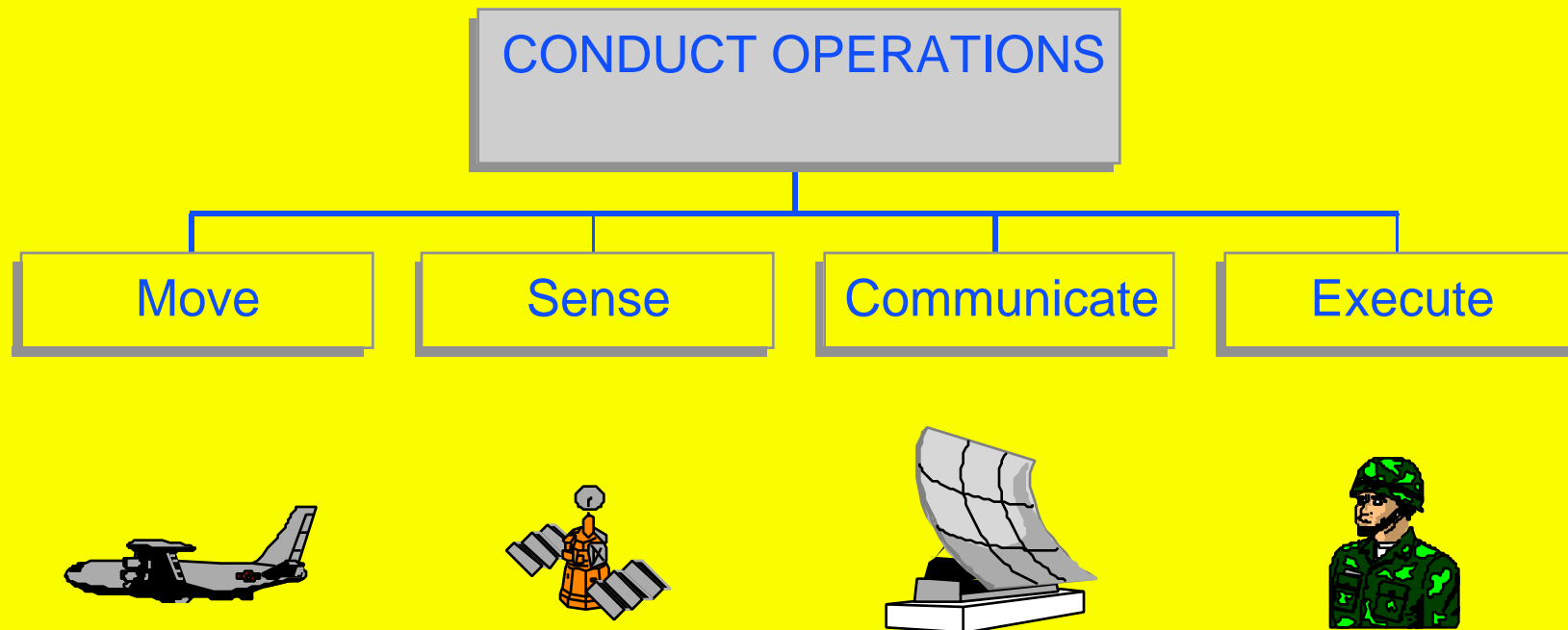5. Verify and Validate Verb Syntax And Semantics

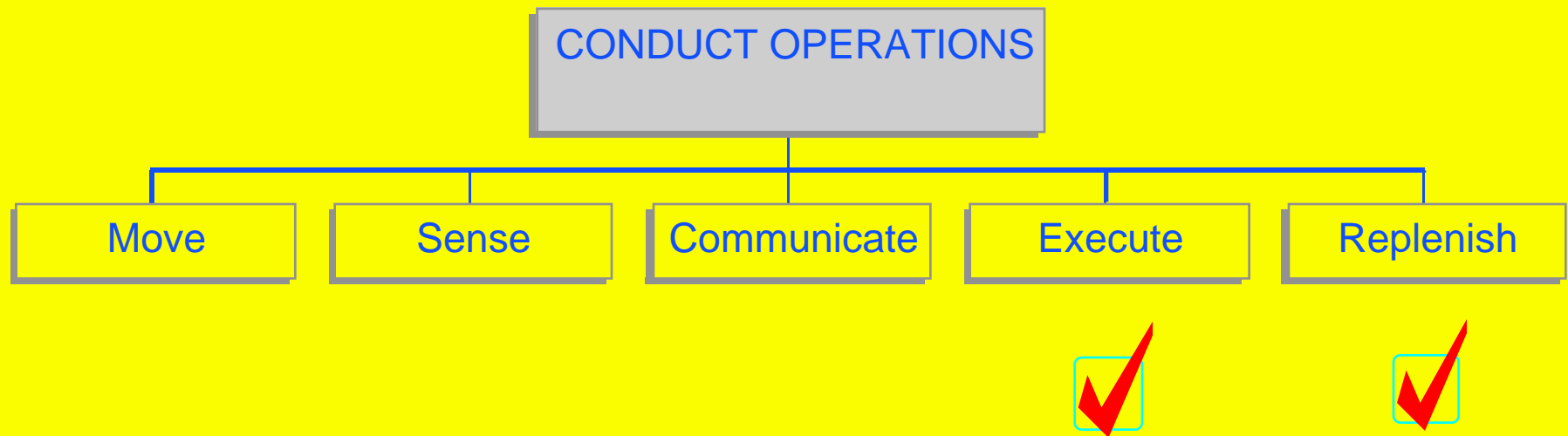# SYNTACTICAL
STRUCTURE: **COMMAND AND CONTROL***

COMMAND AND CONTROL

Supervise and Synchronize (Direct Operations)	Monitor Situation (Gather Information)	COA Development (Prepare Alternative Plans)	Mission/Task Analysis (Rev/Assess Requirements)
Commit	Parse	Develop	Estimate
Divert	Collect	Research	Anticipate
Assign	Find	Plan	Determine
Allocate	Correlate	Examine	Review
Activate	Track	Assess	Prioritize
Coordinate	Verify	Calculate	Update
Command	Monitor		

* Basically Cognitive Processes

STRAW MAN SYNTACTICAL STRUCTURE: CONDUCT OPERATIONS*

CONDUCT OPERATIONS

Move | Sense | Communicate | Execute

CONDUCT OPERATIONS: Alternative 1

CONDUCT OPERATIONS

Move | Sense | Communicate | Execute | Replenish

CONDUCT OPERATIONS: Alternative 2

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                    ┌──────────────────────┐
                    │  CONDUCT OPERATIONS  │
                    └──────────────────────┘
         ┌─────────────┬──────────┴──────────┬─────────────────┐
    ┌─────────┐   ┌─────────┐   ┌──────────────┐   ┌──────────────────┐
    │  Move   │   │  Sense  │   │ Communicate  │   │ Perform Mission  │
    │         │   │         │   │              │   │   Activities     │
    └─────────┘   └─────────┘   └──────────────┘   └──────────────────┘
                                                  ┌────────┴────────┐
                                            ┌──────────┐    ┌────────────┐
                                            │ Execute  │    │ Replenish  │
                                            └──────────┘    └────────────┘
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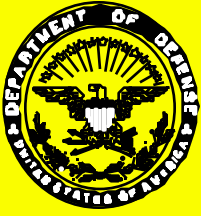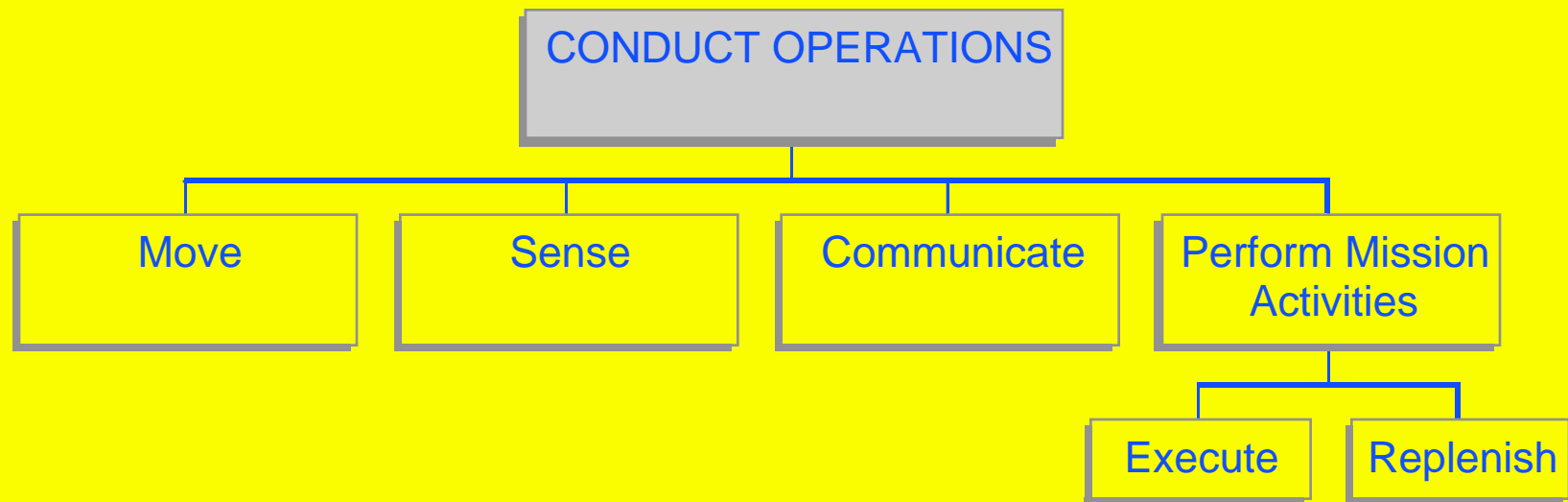
TO DATE PROGRESS

- Have Compiled 670 Processes From Authoritative Sources
    JP 1-02, AFM 1-1, FM 100-5, JMTGM Approvals,
    NATO Terms, JEL, UJTL, AF Domain Experts

- Have Collected AF Tactical Data

- Have Carefully Sourced Data
    - Traceability Is Key

- Assigned Definitions From Authoritative Sources

TO DATE PROGRESS (CONTINUED)

• Have Syntactically Structured The Verbs/Processes

• Have Begun To Scrub Data

• Have Developed CSS *Access* Data Base (Ontological Tool)
- Data Input Forms
- Report Generator
- Search Algorithms
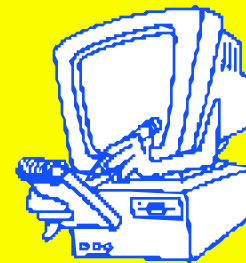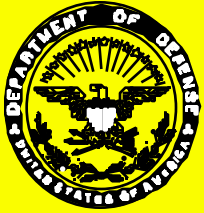
TASKS TO BE COMPLETED

- Complete Verb/Process Data Compilation
    - USA, USMC. USN Tactical And Service Specific Data
    - Collect Synonym Data
    - Reconcile Service And Level-Of-Combat Differences

- Validate And Verify Data (Critical Task)

- Assign Pedigrees

- Expand And Complete CSS Data Base And Ontological Tool
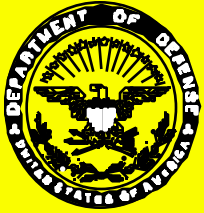
PROJECT PAYOFFS

• Data And Ontological Tool Have Numerous Benefits
  - Common Semantics and Syntax
  - Common Typologies
  - Help To Define Domain And Mission Space Commonalties
  - *Tool Can Enhance The Development Of Integrated And Reusable Simulations And Domain Models*

• Can Serve As A Corner Stone Of The CMMS
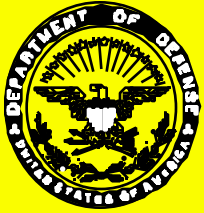
NEXT STEPS

- Expand CSS To Include Other Critical Data Elements

- For Each Process, Specify Its (Entity-Action-Interaction):
  - Input
  - Output
  - Allocation (Entity That Performs Action)
  - Decomposition (Action To Action Relationships)

- Development Of A Integrated Domain Model/Simulation Analytic Front-End
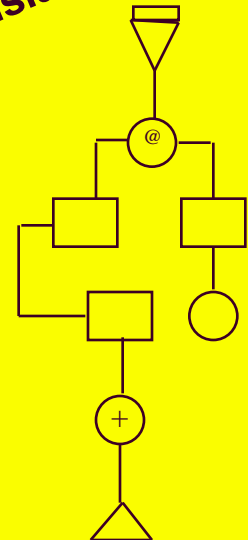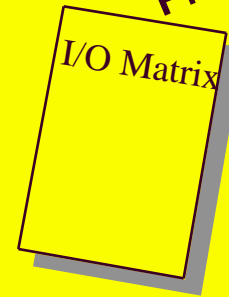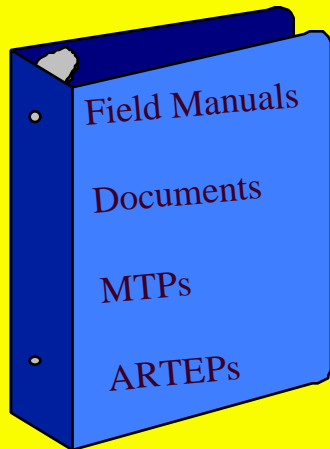
- Development Of Ontological "Filters"

ONTOLOGICAL FILTER

FILTER
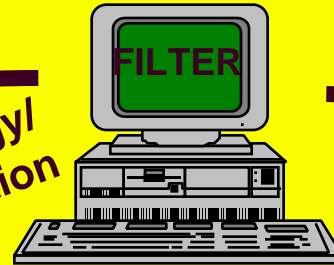
Common Terminology/
Semantics Translation

Common Syntax/
Process Translation

Field Manuals

Documents

MTPs

ARTEPs

CCFs

I/O Matrix

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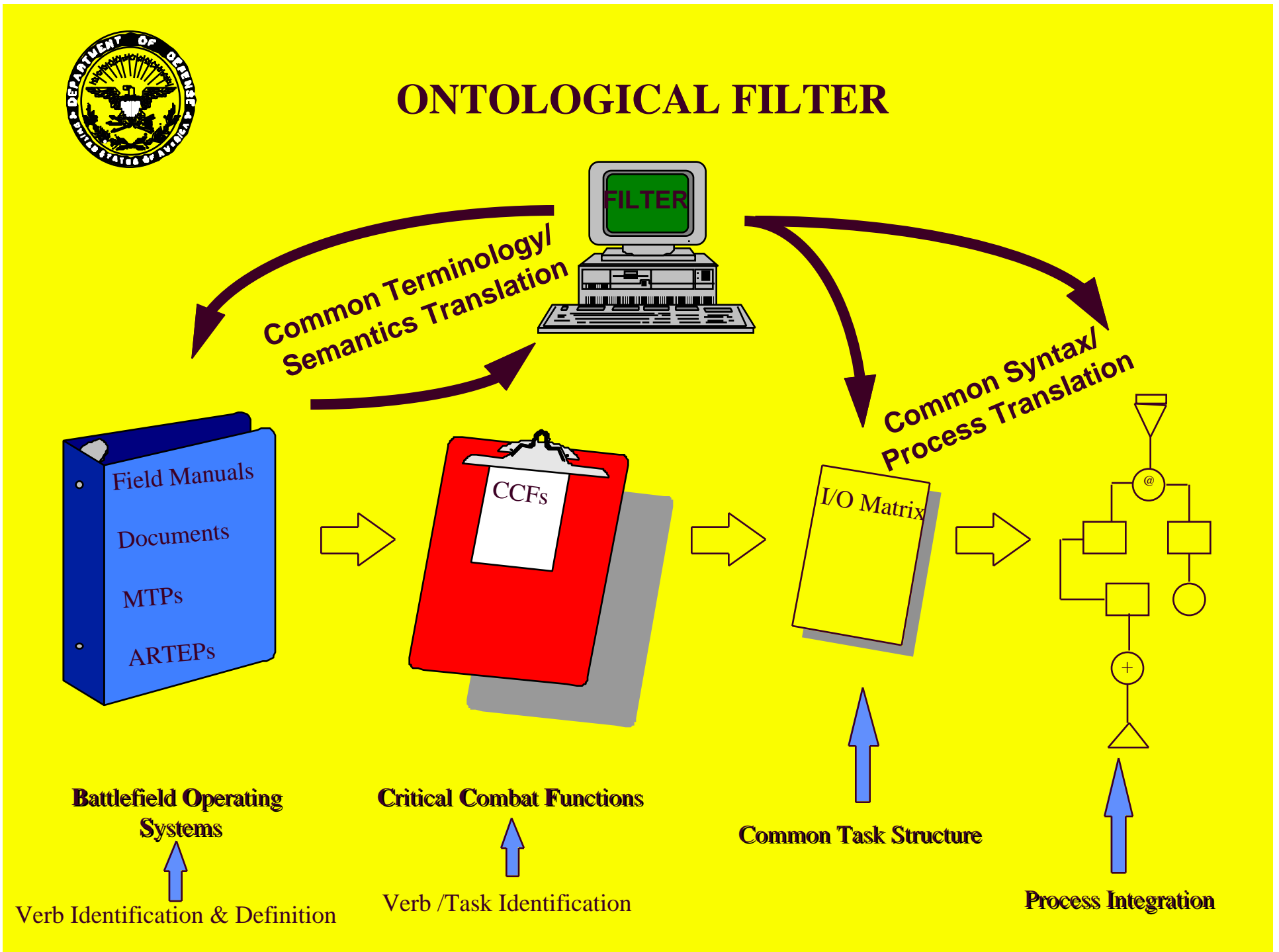
**Battlefield Operating
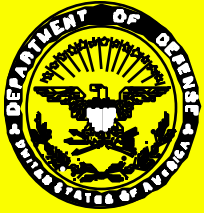Systems**

Critical Combat Functions

Common Task Structure

Process Integration

Verb Identification & Definition

Verb /Task Identification

ONTOLOGICAL TOOL DEMONSTRATION

CMMS CSS